

Claims

What is claimed is:

- 5 1. A head-stage for implanting as a tissue interface,
 comprising:
 a first connector coupled for receiving a plurality of
 electrical signals;
 a flexible substrate coupled to the first connector and
10 including a plurality of conductors for the electrical signals;
 a stiffener substrate coupled to a portion of the flexible
 substrate;
 an electronic circuit disposed on the flexible substrate
 above the stiffener substrate and having inputs coupled to the
15 plurality of conductors; and
 a second connector supported by the stiffener substrate
 and coupled to an output of the electronic circuit.
- 20 2. The head-stage of claim 1 wherein the flexible substrate
 includes benzocyclobutene.
3. The head-stage of claim 1 wherein the flexible substrate
 includes polyimide.
- 25 4. The head-stage of claim 1 wherein the flexible substrate
 overlies a portion of the stiffener substrate.
5. The head-stage of claim 1 wherein the electronic circuit
 performs signal processing on the electrical signals.
- 30 6. The head-stage of claim 1 wherein the flexible substrate
 and stiffener substrate are implanted under a skin surface of a
 test subject.

7. The head-stage of claim 1 wherein the second connector is a zero insertion force type connector.

8. A head-stage, comprising:

5 a flexible substrate including a conductor for conducting an electrical signal;

a stiffener substrate coupled to a first end of the flexible substrate;

10 an electronic circuit supported by the stiffener substrate and having an input coupled to the conductor; and

an external interface coupled to an output of the electronic circuit and supported by the stiffener substrate for transmitting the electrical signal.

15 9. The head-stage of claim 8 wherein the flexible substrate includes benzocyclobutene.

20 10. The head-stage of claim 8 wherein the external interface includes a first connector supported by the stiffener substrate and coupled to an output of the electronic circuit.

11. The head-stage of claim 10 wherein the first connector is a zero insertion force type connector.

25 12. The head-stage of claim 10 further including a second connector coupled to a second end of the flexible substrate.

13. The head-stage of claim 8 wherein the flexible substrate overlies a portion of the stiffener substrate.

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14. The head-stage of claim 8 wherein the flexible substrate and stiffener portion are implanted under a skin surface of a test subject.

15. The head-stage of claim 8 wherein the electronic circuit conducts the electrical signal bi-directionally along the conductor.

5 16. An integrated head-stage, comprising:

an integrated substrate having a first portion forming an electrode for implanting into live tissue and a second portion forming a flexible substrate and including a conductor for conducting an electrical signal;

10 a stiffener substrate coupled to an end of the flexible substrate opposite the electrode; and

an external interface supported by the stiffener substrate for transmitting the electrical signal.

15 17. The integrated head-stage of claim 16 wherein the external interface includes an electronic circuit disposed above the stiffener substrate and having an input coupled to the conductor.

20 18. The integrated head-stage of claim 17 wherein the external interface further includes a first connector supported by the stiffener substrate and coupled to an output of the electronic circuit.

25 19. The integrated head-stage of claim 18 wherein the first connector is a zero insertion force type connector.

20. The integrated head-stage of claim 16 wherein the electrode and flexible substrate include benzocyclobutene.

30 21. The integrated head-stage of claim 16 wherein the flexible substrate overlies a portion of the stiffener substrate.

22. A head-stage for implanting as a tissue interface,
comprising:

· a flexible substrate including a conductor for conducting
an electrical signal;

5 a stiffener substrate coupled to the flexible substrate;
and

 an external interface supported by the stiffener substrate
for transmitting the electrical signal.

10 23. The head-stage of claim 22 wherein the flexible substrate
includes benzocyclobutene.

24. The head-stage of claim 22 wherein the external interface
includes an electronic circuit disposed above the stiffener
15 substrate and having an input coupled to the conductor.

25. The head-stage of claim 24 wherein the external interface
further includes a first connector supported by the stiffener
substrate and coupled to an output of the electronic circuit.

20 26. The head-stage of claim 25 wherein the first connector is
a zero insertion force type connector.

27. The head-stage of claim 22 wherein the electronic circuit
25 conducts the electrical signal bi-directionally along the
conductor.